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# Supporting ground- based weapon systems in the battlefield

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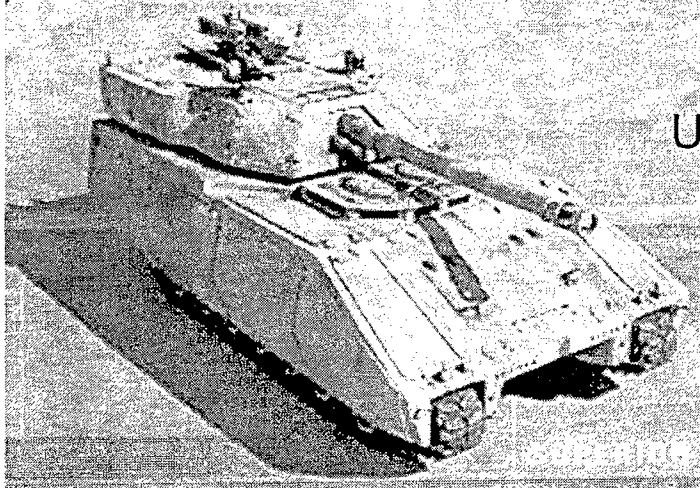
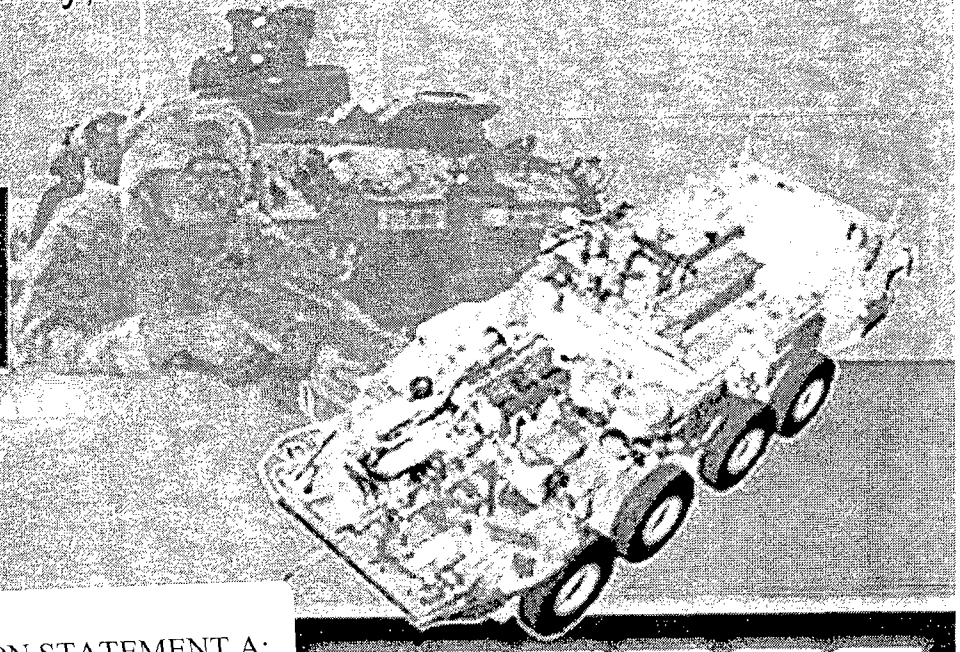
Presented at the SME Management Forum on PLM
Troy, MI Dec 8, 2005







RDECOM TACOM



TARDEC
U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

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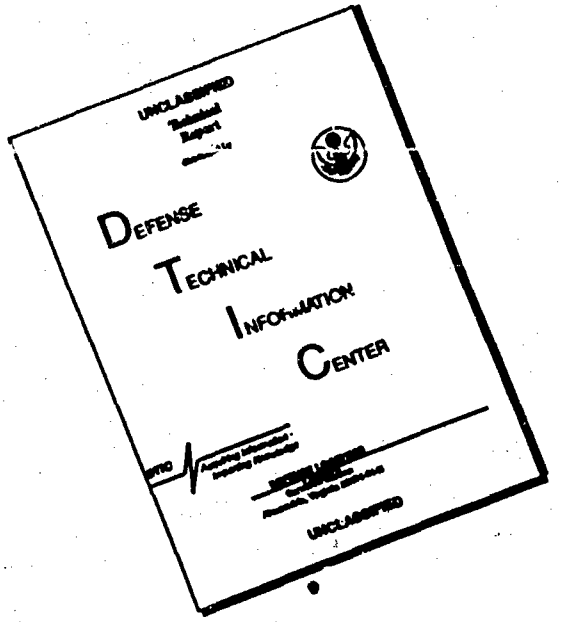


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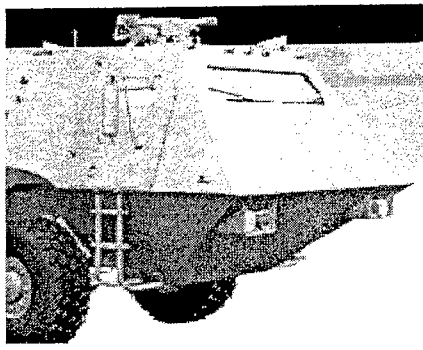
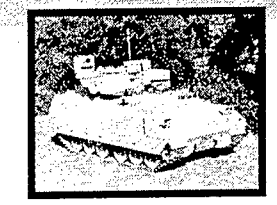
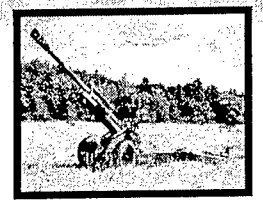
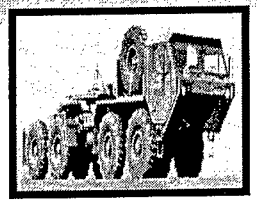
# TACOM - Supporting Army Readiness









## SUPPORT

Capital Value of TACOM Equipment $81.7B

2993 Fielded Systems Supported

> 26,000 Components

## PRODUCT LINES

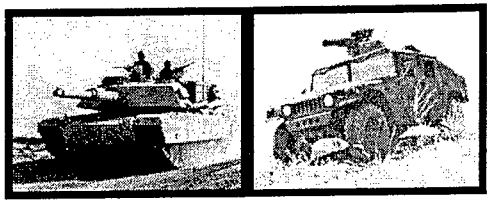
- Combat Vehicles
- Trailers
- Materiel Handling Equipment
- Fuel & Water Dist Equipment
- Chemical Defense Equipment
- Howitzers
- Mortars
- Machine Guns
- Aircraft Armaments
- Rail
- Fuel & Lubricant Products
- Tactical Vehicles
- Construction Equipment
- Tactical Bridges
- Sets, Kits & Outfits
- Shop Equipment
- Large Caliber Guns
- Rifles
- Ammunition
- Demolitions & Explosives
- Watercraft
- Non-Tactical Vehicles

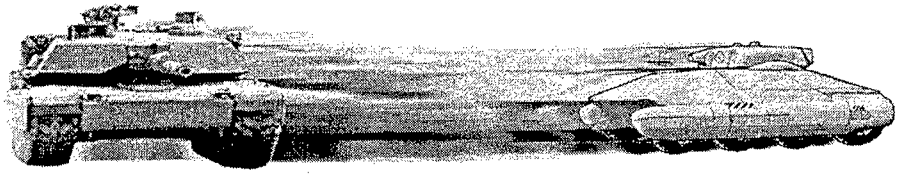
Plus Technology Development for the Objective Force

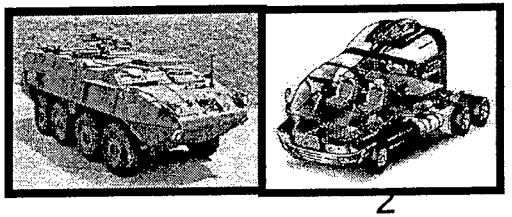
## MAGNITUDE

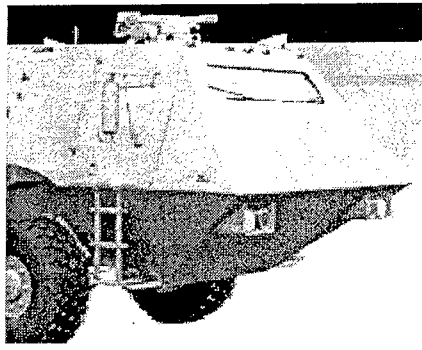
141 Allied Countries own TACOM Equipment

All Army Parent UICs Contain TACOM Supported Equip





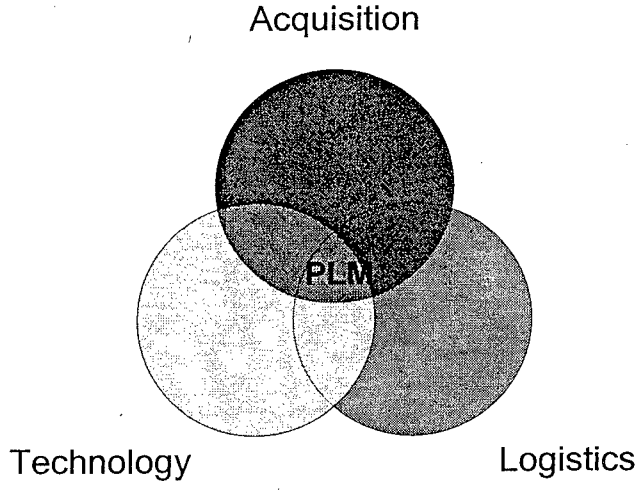


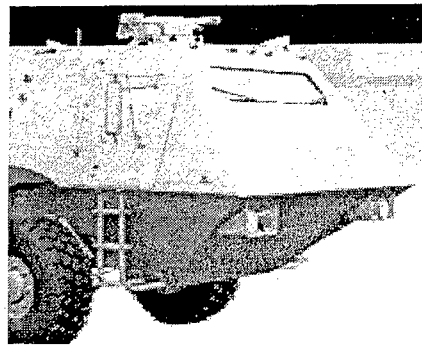


# Army Definition of PLM

The integration of acquisition, technology and logistics systems and processes using open standards for interoperability among enterprise systems.

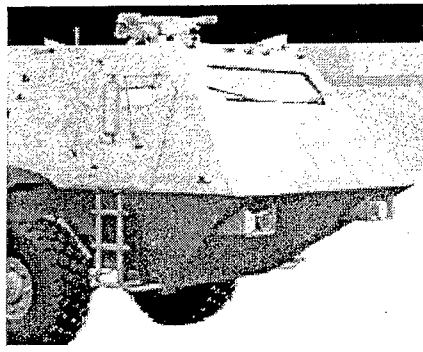
Definition:
Product Lifecycle Management (PLM)
Is the integration of Engineering PLM and sustainment or logistics PLM





# Motivation & Driving Factors

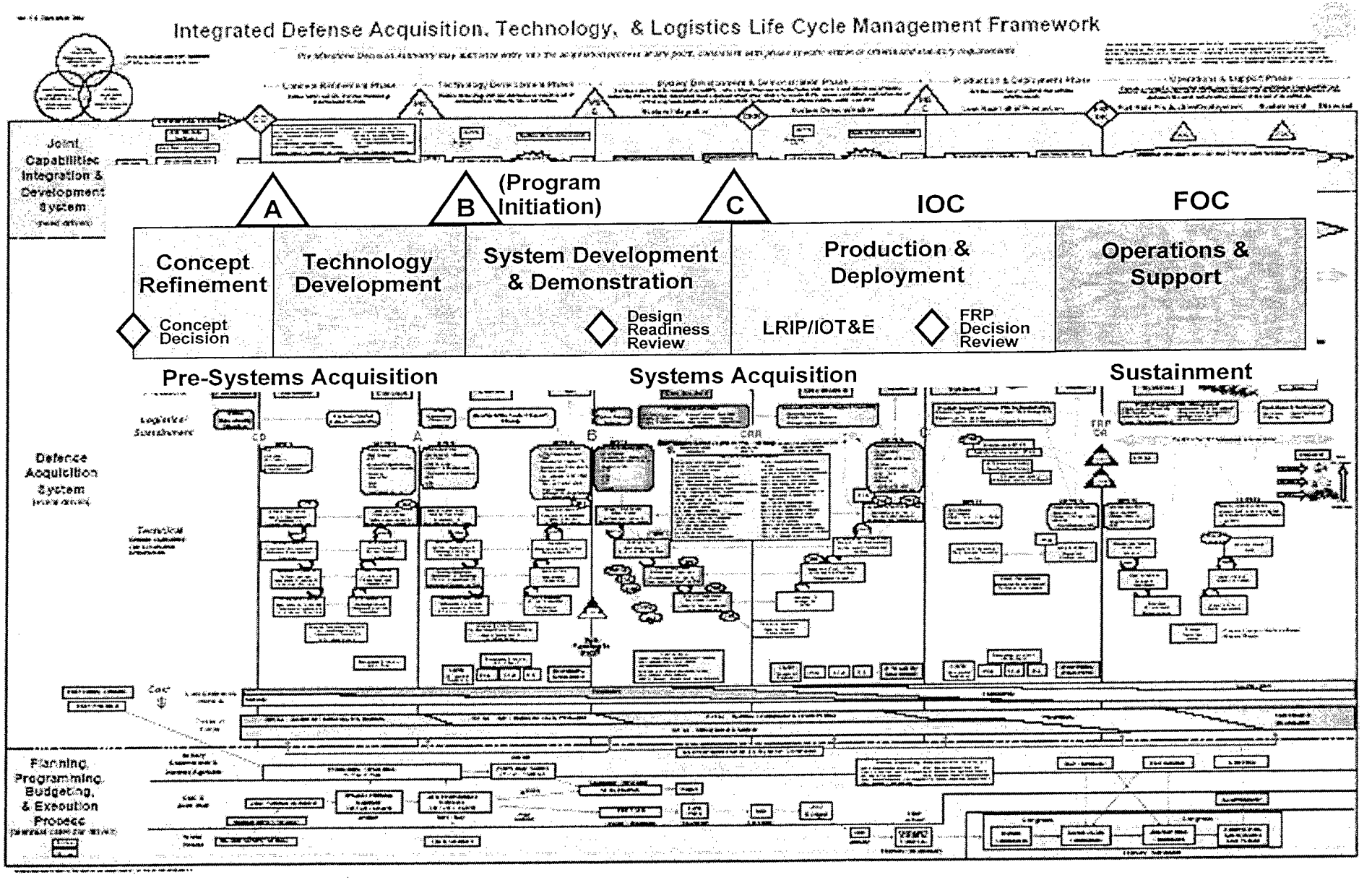
- Many of the current ground weapon systems will continue to be in service for another 20-30 years
  - Need ability to support systems after production
  - Reduce sustainment costs
- Performance Based Logistics emphasizes access to product data on demand and in real-time directly from OEMs
- Need tech data to support RESET/RECAP efforts at depots to meet surge requirements from war effort
- Validated product data critical to the success of various AMC logistics modernization efforts such as Single Army Logistics Enterprise (SALE)

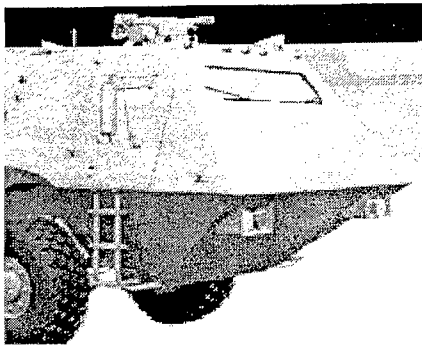


# Need for PLM at the US Army

- Army in transformation
- Integrated product data resources through the lifecycle – engineering and logistics
  - Minimize data duplication
  - Single source for technical data
- Multiple organizations – government and private have system responsibility
  - Data exchange and collaboration among organizations is inefficient and time consuming
- Need rapid response to current operations including joint requirements
- Complex system of systems approach to weapons systems
- Improved collaboration with suppliers
- Data on demand in the hands of the war fighter

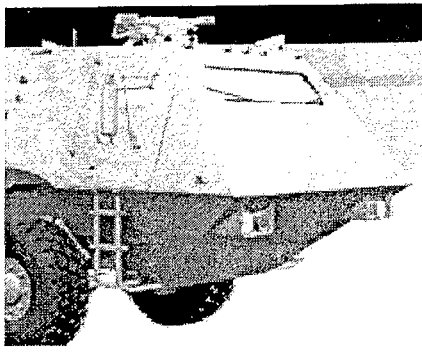
# PLM in terms of DoD Acquisition Framework





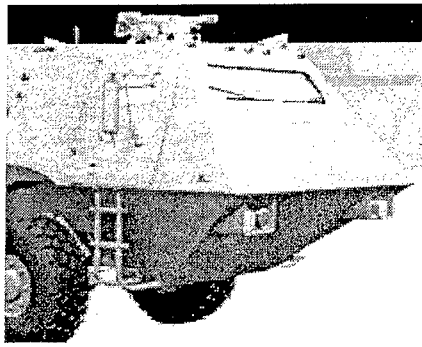
# Army PLM requirements

- Single point of entry to unified product data
- Federated approach to product data management
- Product data on demand
- Real-time collaboration
- Open PLM architecture for interoperability
- Automated product data management (product structure and BOM)
- Multiple views of product data
- Configuration Management
- Network and security issues (Information Assurance)
- *Integration between engineering and ERP/ logistics systems*



# Some Army PLM challenges

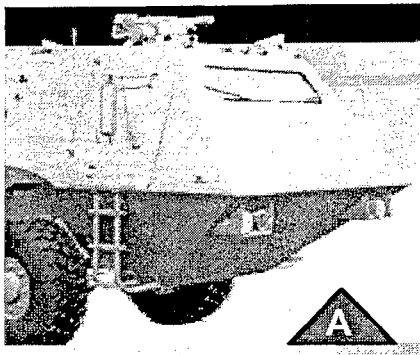
- Heterogeneous systems and product data formats - interoperability
- Extended systems lifecycle
- Legacy paper-based business processes
- Legacy data
- System of systems engineering
- Spiral development/ Evolutionary acquisition
- Performance Based Logistics
- Parts obsolescence
- Unique disposal issues



# Key Technology Enablers

- Federated system of systems for product data management
  - Integrated and logically unified lifecycle product data
  - Single virtual repository for data
  - Enterprise search and view capability
  - Single source of authenticated truth
  - Multiple views of same integrated data depending on function
- STEP PLCS standards (ISO 10303) for enterprise interoperability
- Unique Identification for configuration management and tracking – as-designed, as-built, as-maintained

# PLCS enabled PLM



A (Program Initiation) B C IOC FOC

Concept Refinement | Technology Development | System Development & Demonstration | Production & Deployment | Operations & Support

Concept Decision ◇ Design Readiness Review ◇ LRIP/IOT&E ◇ FRP Decision Review

Pre-Systems Acquisition | Systems Acquisition | Sustainment

Lifecycle Product Data = Tech Data + Log Data

Tech Data

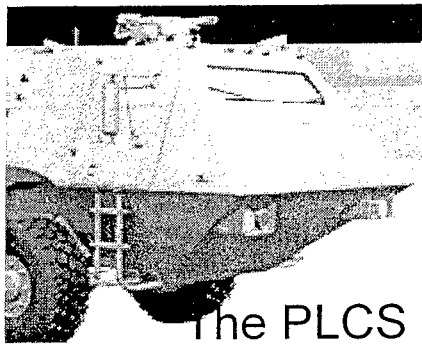
Log Data

PLCS Master Data Model Integrator

Acquisition/ Engineering PLM

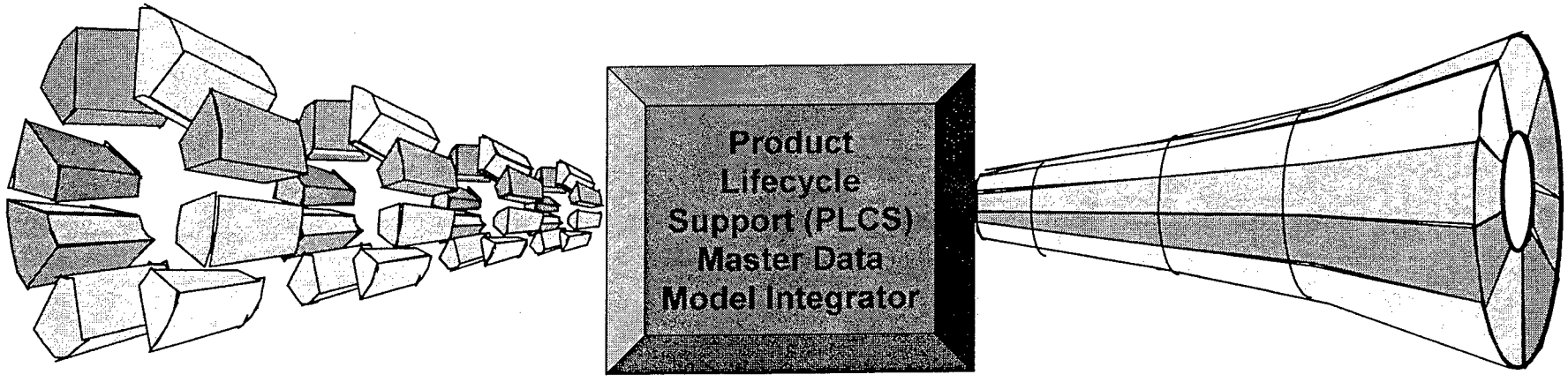
SALE Logistics/ Sustainment PLM (Repairables)

Business Systems Modernization (BSM) (Consumables)



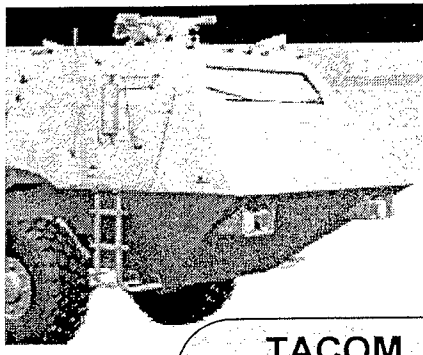
# PLCS Based Product Data Integration

The PLCS Master Data Model integrates lifecycle product data from multiple heterogeneous systems to provide a unified view of product data that flows seamlessly between the enterprise systems




| As-Is Product Data | To-Be Product Data |
|---|---|
| Multiple Army and OEM PDM's | Integrated and unified product data |
| Multiple disconnected logistics databases | Federated system of systems based PDM |
| Stove piped tools and processes | Multiple views of single-source of truth |
| No configuration tracking | Standards-based for long term data retention |

# FALCON architecture for TACOM



TACOM GSIE

- Anniston Army Depot
- Watervliet Arsenal
- Rock Island Arsenal
- Red River Army Depot
- Sierra Army Depot

TARDEC

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Federated Army Lifecycle Collaborative e-Nterprise

OEMs

- GENERAL DYNAMICS Land Systems
- AM General
- United Defense

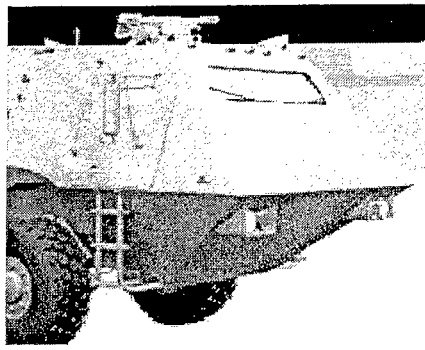
DLA (BSM)

Program Executive Offices

- Program Executive Office Ground Combat Systems
- PEO CS&CSS

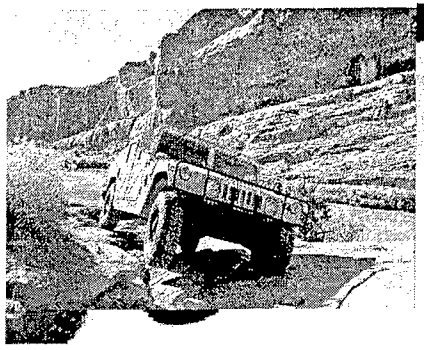
SALE

SALE



# Potential Benefits

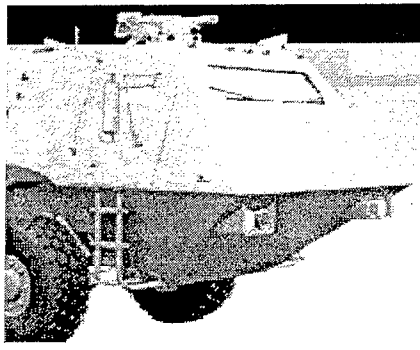
- Integrated model-based engineering and logistics processes
- New business practices for OEM collaboration, data exchange and contracting based on technology
- Track as-built and as-maintained configurations of ground systems at depots to support reset and recap efforts
- On-demand Interactive Electronic Technical Manuals on portable handheld devices at the hands of the war fighter
- Proactive product improvement based on field feedback and failure history
- Integration of LSAR/ provisioning data with tech data using a structured Bill of Materials
- Up-to-date product data at DLA for procuring consumables by automatic validation against source to reduce acquisition lead times



# The HMMWV PLM pilot

- HMMWV is rapidly undergoing changes – not just by AM General the manufacturer
- Need validated and current tech data for major system modifications such as Long Term Armor Strategy, Re-power, seatbelts, cooling, etc.
- Need to be able to pull required product data directly and automatically from AM General's PDM on-demand
- Much of the HMMWV is available as 3D solid models in Unigraphics format but not completely leveraged for all business processes
- 2D raster drawings on CDs are still used as the exchange format because it is the lowest common exchange format
- Separate as-designed and as-built configurations that have to be resolved and validated

# Current Implementation for HMMWV



AM General

TARDEC

User searches for part

STEP Part 28 XML File

Automatic Import

Teamcenter AP214 Translator

Automatic Export

Windchill AP214 Translator

TEAMCENTER

PTC

Federation Teamcenter Server

Federation Windchill Server

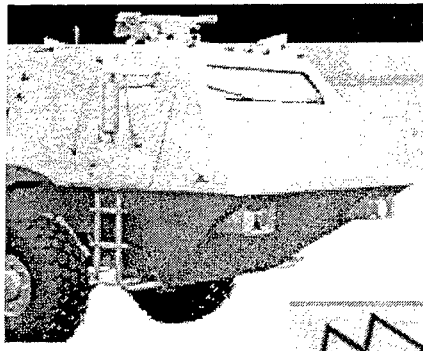
Search for part inside Teamcenter

Automatically poll source for changes to master data

Updated product data available

Automatically update product data at target or provide notification to approved users

# FALCON - A Collaborative Effort

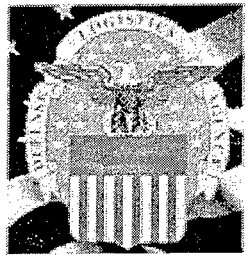


PDES, Inc.®

Rock Island Arsenal

Unique Identification is Transformation
UID

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA



AM General

eurostep

EPM TECHNOLOGY

LOGSA

PTC

UGS
The PLM Company

TARDEC

SAP

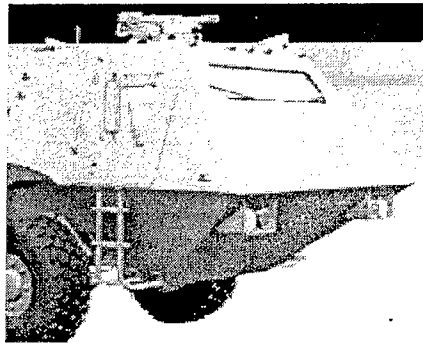
DALET
Department for Army Logistics Enterprise Integration
SINGLE ARMY LOGISTICS ENTERPRISE
SALE

NIST
National Institute of Standards and Technology

One Team Committed to Soldiers
ILSC
INTEGRATED LOGISTICS SUPPORT CENTER

ENTERPRISE Integration inc.

FEDERATION



# Contact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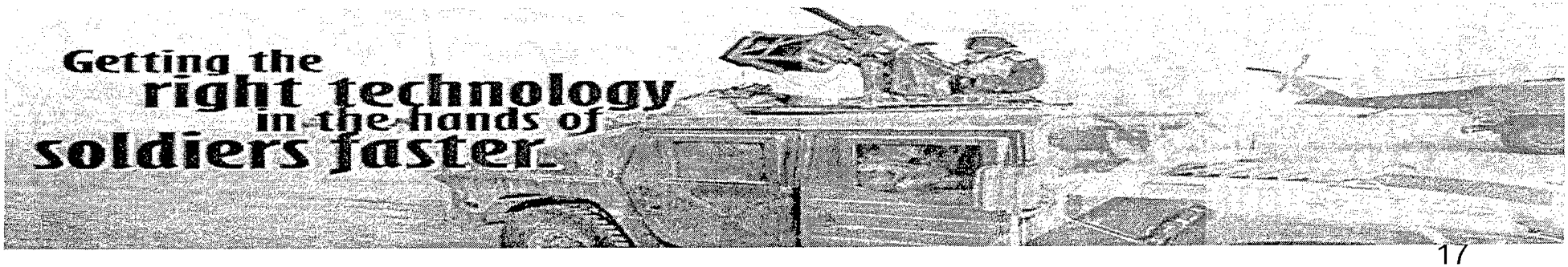

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Signature: Raj Iyer Date: 11/28/05 Phone: x47186

(Step 3) Gov't Supervisor: Arthur Adlam Grade: NH-IV Position: Assoc Director

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